



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A23N 4/08	A1	(11) International Publication Number: WO 99/16322 (43) International Publication Date: 8 April 1999 (08.04.99)
<p>(21) International Application Number: PCT/GR98/00023</p> <p>(22) International Filing Date: 28 September 1998 (28.09.98)</p> <p>(30) Priority Data: 970100369 29 September 1997 (29.09.97) GR</p> <p>(71) Applicants: KOURTZIS, Michael (heir of the deceased inventor) [GR/GR]; 8 Festou Street, GR-145 61 Kifissia (GR). KOURTZIS, Charalambos [GR/GR]; 8 Festou Street, GR-145 61 Kifissia (GR). KOURTZIS, Panagiotis [GR/GR]; 8 Festou Street, GR-145 61 Kifissia (GR).</p> <p>(72) Inventor: KOURTZIS, Panagiotis (deceased).</p> <p>(74) Agent: DIMAKIS, Michael; 7 Asclapiou Street, GR-106 79 Athens (GR).</p>	<p>(81) Designated States: TR, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report.</p>	

(54) Title: OLIVE CROP PROCESSING METHOD

(57) Abstract

Olive-tree crop processing method to produce olive-oil, consisting of the interpolation to the currently existing methods of a ginning machine, which separates the olive-stone from the olive pulp and, in line, of two pairs of streaked cylinders which break the olive stones. The distance between the cylinders of the first pair is longer, so that only bigger stones can be broken, whereas the distance between the cylinders of the second pair is shorter, so that smaller stones can be broken. At the next stage, by centrifugation or extraction, the sperm of the olive stone is isolated from the broken stones, while the rest, of wooden nature is mixed with the olive pulp so that olive-oil can be produced. From the isolated sperm of the olive stone, with the existing production methods of seed-oils, the creation of a new product -the oil of the olive stone sperm- becomes possible.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

DESCRIPTION

Olive crop processing method

The present invention is referring to an olive-crop processing method, through which the production of oil from the sperm of the olive stone becomes possible. Mainly two methods are used today for the olive-oil production: a) 'Classic' oil-presses (old type). At the above mentioned oil-presses there is the 'oil-mill', known since the ancient age, to whom, nowadays, a metall centrifugal crusher is added, in order to feed the oil-mill with fully crushed (pulp and stones) olive-crops, so that the most effective 'milling' of the oil-mill is facilitated and achieved. Also, in many cases, a pugging machine with rotary blades is added, so that, via heating of it with lukewarm water (with circulation of it through double walls), the mass of the 'ground' olive-crop is better homogenized, resulting the easiest pressure of the consisted vegetable liquids and olive-oil at the oil-presses that will follow.

b) 'Modern' type oil-presses (centrifugal): At the modern oil-presses a centrifugal crusher of great power is used for the crushing of the olive-crop. Following (the pugging machine acting as an intermediate at production line) the production line is continued with the feeding of the well-known horizontal separator 'DECANTER', after the addition to the pugging machine of the proper amount of lukewarm water for the 'DECANTER'S' normal operation and the production of a) olive-oil and b) olive-cake with 50% and consisted olive pomace-oil at about 5%. With the currently used methods the olive-stone is fully breaked, since it is crushed and transformed to a united mass, consisted of wood (the wooden part of the olive-stone) and the olive-stones sperm. This mass is -with the current methods- necessary for the production of olive-oil. since that, only from the pulp of the olive (without the existance of the 'hard' wooden part as the olive-stone), the pulp can not be effectively pressed at the 'classic' type oil-presses and, in the case of the modern centrifugal oil-presses, the existance of the crushed stone is demanded because the solvent liquid which is used at the extractors of the olive-oil factories production lines, in order to soak, dissolve the mass (through repeated 'washings') and receive the consisted oil, cannot penetrate the massive mass of the crushed olive-crop. On the other hand, with the mixing of the broken stones, the solvent liquid infiltrates easily the mass. As a result, with the current methods of olive-oil production (and olive pomace oil), the existing in the

olive-stone sperm can not give its useful substances (to produce pure -'virgin'- oil), because it is used only incorporated with the wooden part of the olive-stone (as pulp). as 'helping' material for the production of olive-oil and as raw material for the production of olive pomace-oil. So with the current state of the art, the olive-crop is not exploited to the maximum, as pure -'virgin'- oil is not produced from the sperm. Moreover, the 'washing' of the mass results to the loss of many solvent liquids at the liquid ingredients of the crop.

The present invention constitutes an olive-crop processing method having as a result the production of oil from the sperm of the olive-stone, without creating any kind of problem at the usual olive-oil production procedure. The present invention is consisted in the modification of the current procedures of the olive-oil production, with the interpolation of a ginning machine (which separates the stone from the pulp) and of a pair of cylinders with streaks.

Specificly:

1) At the 'classic' type oil presses: At the above described method, the crusher is replaced by a ginning machine, who's only purpose is to separate the pulp from the unbroken stones, which -on an average- represent the 20% of the olive-crop's weight (that is achieved with the use of much less power than the power used at the current methods of production: as much power as needed in order that the very hard olive-stones will not be broken in fourty to fifty little pieces, but will only be separated from the pulp). Following, the crush of the "pure" olive-crop -without stones- will be completed at the oil-mill. Perhaps if the processed olive-crop is relatively green and, as a consequence, hard, one or two horizontal streaked cylinders (similar to those used for the grinding of the wheat) will have to be added at the exit of the ginning machine, so that no part of olive-crop skin (which retains an important percentage of olive-oil) will fall into the oil-mill so the pulping of olive mass will be perfect. However, because the mass from which the stones are being removed is too liquid, it is almost impossible to be pressed in any kind of press (that is why the use of the above mentioned ginning machine in the 'classic' type olive-oil factories has failed). However, with the above described method, pieces of broken stones -from which the sperm will have been removed (as described below), will be added to the mass; with the addition of these pieces -about 20% of the masss (almost the initial composition of the olive-crop), the olive-crop procedure will be continued (with the currently used

methods) to the production of the proportional olive-oil and oil-cake, with relatively low percentage of hydration -about 26%.

The separation of the sperms from the stones will be achieved at the same olive-oil factories using the following procedure: After the ginning of the crop and the
5 separation of the stone from the pulp, the unbroken stones will pass through two, pairs of horizontal cylinders with streaks (manufactured already at the past and from the greek company 'BIO', similar to those which grind the wheat). These pairs of cylinders will be positioned in a row. The stones will be simply broken to few small pieces, without being crushed (using a maximum moving power of the cylinders of
10 5hp; that means without hurting of the consisted in the stone sperm). The distance between the streaks of the first pair's cylinders will be as long as the size of the big stones of the crops, so that only big stones will be broken and small stones will pass through. These small stones will be broken at the second pair of cylinders, at which the distance between the cylinder's streaks will be smaller. The 'mixture' of broken stones
15 and unhurted sperms will be a) either separated in a centrifugal separator because of the difference of the specific gravities (the 'mixture' is dry) b) either thrown in a tank with conic bottom, which will contain slightly salted water and, again because of the difference of the specific gravities, the sperms will float immediately and will be removed from the surface of the water, with any mechanical means, as for example a
20 transporting screw with holed bottom, or a holed spoon. Then, the contents of the tank will be flown in a second 'helping' tank and will the tank be filled again with slightly salted water, in order to repeat the above procedure. The stones which remain at the bottom of the tank, with the opening of the cap of the tank's conic bottom, will flow into a receiver with transporting screw and will be guided to the above mentioned
25 pugging machine (so that the pulp of the olive-crop and the vegetable liquids of the olive-oil will become able to be pressed in order to complete the processing of the olive-crop in the existing presses). 2) At modern type (centrifugal) olive-oil factories: As at the 'classic' type olive-oil factories, the use of the present method will be achieved simply with the replacement of the currently existing high power centrifugal
30 crusher with the above described ginning-crushing machine (the separator of the stones from the pulp and the two pairs of horizontal streaked cylinders). The broken stones (from which the sperms will have to be removed as described above) will be added at the existing pugging machine of the production line and the production will

continue as usual, with the feeding of the horizontal separator, called 'DECANTER'. With the above described way, in both types of olive-oil factories, the virgin olive oil will be produced normally without any harm to its quality, while the 'pure' removed sperms of the stones are gained (without the mixing of the wooden part of the stones or of any other substances, and without the use of solvent substances). From those sperms, the production of oil becomes possible with the methods (and technical means) that are used nowadays for the production of any kind of seed-oils; that means with pressure (with that kind of treatment the production of high quality oil will be possible, but in smaller quantities) or with extraction. The advantages of the above method consist to the ability of isolation of the sperm, during the processing of the olive-crop, from the rest of the stone, without causing any problem at the currently applied methods of olive-crop processing and virgin olive-oil production. Until today, the sperm of the olive-stone was trivialized for the production of olive pomace-oil (having as a result that it was always crushed in mixture with the wooden part of the stone), as its separate exploitation was impossible. With the ability of isolation and special processing of the sperm, the creation of a new product, the oil from the olive-stones sperm, becomes possible. At the same time, with the re-use of the stone's wooden part, the procedure of virgin olive-oil's production stays the same. This method helps to achieve the production, from the same initial amount of olive-crop, both of the normally produced olive-oil and of the oil from the olive-stones sperm, which will have prime quality. On the opposite side, until today, it has been possible to receive only the olive-oil as a product of prime quality, because the oil that could be produced from the sperm was degenerated to (the well-known and produced from the olive-stones) olive pomace-oil, which is a product of lower quality. Moreover, the oil from the sperm is edible, of prime quality, scentless, has sweet taste, with no need of further process and has low acidity (below 1-grade). In any case it is of higher quality than the olive pomace-oil. In addition, as it is produced by simple pressure and, being a completely natural product, it consists of natural substances and chemical compounds, even more from the equivalents of the virgin olive-oil. And this, because the virgin olive - oil, due to the centrifugal system, which is used for its production-suffers from important washing (because of the added water), that results to the loss of all its water-soluble substances.

Last but not least, it is very realistic to believe that the price this new product will

enjoy will be as high as the price of the best currently sold 'extra-virgin' olive-oil ('super' quality), even higher. In any case, the price will be superior to the olive pomace-oil's.

5 The wooden rest (pieces of stones) which remain after the removal of the sperms, can be used as combustible, clear (flowing) matter of very important calorific energy (4000 cal/kg), ready to be used immediately at the olive-oil factories and at the already working at them furnaces.

CLAIMS

1. Olive-crop processing method, by pressing at the 'classic' type olive-oil factories or by centrifugation in modern type olive-oil factories, characterized by the interpolation, at the currently used method of a ginning machine, of two pairs of streaked cyliders and of a seperator, which seperates the sperm of the olive-stone from the olive-oil's production.
5
2. Olive-crop processing method, according to pretention 1, characterized by the fact that the ginning machine seperates the olive-stone from the olive-pulp.
- 3.Olive-crop processing method, according to pretention 1, characterized by the fact that the pairs of cylinders break the already separated olive-stone in few little pieces. with maximum exerced power of the cylinders, 5hp, without crushing or hurting the consisted sperm.
10
- 4.Olive-crop processing method, according to pretention 1, characterized by the fact that the olive-stone 's sperm is seperated (with centrifugation or in a water tank) from the wooden part of the olive-stone due to the difference of specific gravities.
15
- 5.Olive-crop processing method, according to pretention 1, characterized by the fact that the production of olive-oil is achieved with the currently used methods, only with the use of the wooden part of the olive-stone and without the use of the removed sperm.
- 20 6.Olive-crop processing method, according to pretention 1, characterized by the creation of a new oil product, made of the press or extraction of the olive-stone's sperm.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GR 98/00023

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A23N4/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A23N C11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	OA 9 399 A (NUOVA MAIP MACCHINE AGRICOLE) 15 September 1992 see the whole document ---	1-6
A	FR 2 422 713 A (PUJOL JEAN FRANCOIS) 9 November 1979 see page 1, line 31 - page 2, line 25 ---	1
A	FR 670 500 A (ACQUARONE A.) 6 December 1929 see page 1, line 36 - page 2, line 89 ---	1
A	EP 0 581 748 A (INN TEC SRL) 2 February 1994 see abstract ---	1
-/--		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

6 January 1999

Date of mailing of the international search report

13/01/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Acerbis, G

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GR 98/00023

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
----------	--	-----------------------

A	FR 1 200 931 A (ETABLISSEMENTS BARDON) 24 December 1959 see the whole document -----	1
---	---	---

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GR 98/00023

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
OA 9399	A	15-09-1992	IT 1243863 B IT 1251681 B	28-06-1994 19-05-1995
FR 2422713	A	09-11-1979	NONE	
FR 670500	A	06-12-1929	NONE	
EP 0581748	A	02-02-1994	IT 1262967 B	23-07-1996
FR 1200931	A	24-12-1959	NONE	

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		